

Orthodontic Treatment: The Soft Tissue Paradigm

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Abstract

Since turn of the 20th century orthodontic diagnosis and treatment planning has been based on the Angle paradigm that considers ideal dental occlusion 'nature's intended ideal form'. The orthodontist's task is to seek balance between the patient's aesthetic demands, functional efficiency and structural harmony. The soft tissues largely determine the limitations of orthodontic treatment, from the perspectives of functions and stability, as well as aesthetics. Therefore orthodontist must plan treatment within the patient's limits of soft tissue adaptation and soft tissue contours. This is a case report showing a well finished case keeping in mind the emerging soft tissue paradigm in diagnosis and treatment planning.

Paradigm, a universally accepted scientific truth which at any given time best explains a natural phenomenon.¹ A paradigm can be thought of as the foundation on which a scientific structure is erected, with each brick representing new findings and insights. This appositional phase of scientific progress is quite slow and proceeds until a new and revolutionary paradigm is proposed and accepted, replacing the old paradigm. Usually science advances incrementally by virtue of the cumulative effort of investigators, each adding knowledge by accretion to the currently accepted model or paradigm. In this progression the truth of today become the myths of tomorrow. Practitioners of scientific discipline are generally resistant to accept new paradigm. Nonetheless after a paradigm shift has occurred a veritable explosion of new ideas and information occurs, leading to rapid advances in the field.²

For 100 years orthodontic theory and practice has been based on the Angle's paradigm.³ This model is predicted on a belief system which assumes that nature intends for all adults to have perfectly aligned dental arches, each containing 16 teeth that should

mesh in ideal articulation with the teeth in the opposing jaw. When such "natural" dentitional state occurs, the face also should be in perfect harmony and balance and the stomatognathic system should function ideally.

Orthodontists have traditionally viewed structural discrepancies as the primary limitations of treatment. In reality, the soft tissues more closely determine therapeutic modifiability.² The boundaries of dental compensation for an underlying jaw discrepancy are established by several aspects of soft tissue relationships and functions:

1. Pressures exerted on the teeth by the lips, cheeks, and tongue⁴
2. Limitations of the periodontal attachment
3. Neuromuscular influences on mandibular position.
4. The contours of the soft tissue facial mask
5. Lip-teeth relationships and anterior tooth display during facial animation^{5,6}

Orthodontists have taken a century not necessarily to learn but to accept that the soft tissues largely determine the limitation of orthodontic treatment. As time passed, it became clear that even an excellent occlusion was unsatisfactory if it was achieved at the expense of proper facial proportions. Not only were there esthetic problems, it often proved impossible to maintain an occlusal relationship achieved by prolonged use of heavy elastics to pull the teeth together as Angle and his followers had suggested. Extraction of teeth was reintroduced into Orthodontics in the 1930's to enhance facial esthetics and achieve better stability of the occlusal relationships.

Many authors have suggested utilizing soft tissue analysis as a reliable guide for occlusal treatment and attendant soft tissue changes.⁷⁻¹⁸ Arnett and Bergman presented the Facial Keys to Orthodontic Diagnosis and Treatment Planning as a three-dimensional clinical blueprint for soft tissue analysis

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and treatment planning.^{7, 8}

The increased attention to soft tissue and de-emphasis on perfection, combine to form a biologically driven paradigm that will better serve Orthodontics in the twenty-first century. It is initially an unsettling shift in mindset for at least two reasons:

1. It represents a philosophical “180-degree turn” in the orthodontic conceptual framework.
2. Because orthodontics does not yet have morphometric tools for evaluating soft tissues that are comparable in quality and accuracy with tools for measuring dental and skeletal components. (Table 1)

Table 1: Angle versus Soft Tissue Paradigms: A new way of looking at treatment goals

Parameter	Angle paradigm	Soft tissue paradigm
Primary treatment goal	Ideal dental occlusion	Normal soft tissue proportions and adaptations
Secondary goal	Ideal jaw relationships	Ideal soft tissue proportions define ideal hard tissues
Hard / soft tissue relationships	Ideal hard tissue proportions produce ideal soft tissues will be OK	Clinical examination of intra-oral and facial soft tissues
Diagnostic emphasis	Dental casts, cephalometric radiographs	Clinical examination of intra-oral and facial soft tissue
Treatment approach	Obtain ideal dental and skeletal relationships	Plan ideal soft tissues relationships and then place teeth and jaws as needed to achieve this
Function emphasis	TM joint in relation to dental occlusion	Soft tissue movement in relation to display of teeth
Stability of result	Related primarily to dental occlusion	Related primarily to soft tissue pressure/equilibrium effects

Pre Treatment Fig. 1





Case Report

The chief complaint of the 21 year old patient was malaligned teeth. Patient had insisted in not taking the teeth too much back as she had witnessed her colleague's treatment.

Pre-treatment

Pretreatment photographs Fig 1 show that the patient is having a pleasing profile with normal class I soft tissue relations except the lower lip is slightly everted due to the presence of anterior deep bite. The intraoral findings show Class I molar relation on both sides, canine relation as Class I on right side whereas end-on on

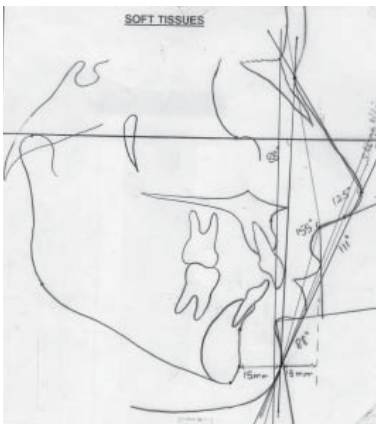


Fig 2

the left side, overjet and overbite of 5mm and 9mm respectively with lower midline shifted to left side by 1mm and lower anterior crowding as 7mm. The case is diagnosed as mild skeletal Class II Angle's Class I molar relation with moderate anterior crowding.

Cephalometric analysis Fig 2 show normal nasolabial angle and increased mento-labial angle due to increased overbite. The upper and lower lip thickness is normal. Patient was treated with upper second and lower first premolar extraction.

Discussion

All the aims and objectives of the treatment are achieved. The patient had mild skeletal class II with dentoalveolar Class I and good soft tissue profile. Therefore Kesling's setup was done before formulating treatment plan. Extraction of upper second premolars helped us maintaining the good soft tissue profile by not allowing excess retraction of upper anteriors. Fig3 Thus the favored nasolabial angle can be maintained with little or not so significant change in the parameter. Excess anterior retraction causes the upper lip to fall back inadvertently thereby giving senile appearance. Also these spaces were utilized to correct the deep bite

Post-treatment



Fig 3



Fig 4

present. Fig 4 Elimination of deep bite by intruding upper anteriors relieved the lower lip-trap like situation which was leading to deep mentolabial sulcus and provided better soft tissue relations. Extraction

of lower first premolars was useful in relieving the crowding in the lower anterior region. Also the midline and the asymmetric archforms were corrected. First premolar extractions were the right choice in the mandibular arch as these teeth lie closer to the area of concern (giving priority to the crowding in anterior region and midline shift).



Fig 5

Post-treatment lateral cephalogram superimposition (Fig 5) showed adequate amount of torque in the anterior teeth. Prognosis for stability of the results is good as Class I canine and adequate interincisal angles are achieved. Also presence of excellent interdigitation in the posterior segments shall maintain the functional efficiency.

Conclusion



Fig 6

As a result of the paradigm of health care evolving from a disease-oriented focus to a wellness model, orthodontics now is viewed more clearly as a health service dedicated to establishing both emotional and physical wellness. Malocclusion of the teeth is not a disease; rather, it is a disability with a potential influence on physical and mental health, and appropriate treatment can be important for the patient's well-being. Soft tissue relationship of the patient has to be given fair amount of weightage

during the treatment plan and while evaluation of the results achieved. Fig. 6

The operational goal of orthodontics is to obtain optimal proximal and occlusal contact of the teeth (occlusion) within the framework

of normal function and physiologic adaptation, acceptable or improved dentofacial esthetics and self-image, and reasonable stability. In some cases these goals may be at cross-purposes, and orthodontists must navigate the area between where they feel most comfortable professionally and where patient input guides them.

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